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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/531,719

04/18/2005

Yasuyoshi Tomoe

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JACOBSON HOLMAN PLLC  
400 SEVENTH STREET N.W.  
SUITE 600  
WASHINGTON, DC 20004

EXAMINER

WU, IVES J

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

07/01/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/531,719

**Applicant(s)**

TOMOE ET AL.

**Examiner**

IVES WU

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

#### DETAILED ACTION

- (1). Applicants' Amendments and Remarks filed on 03/31/2008 have been received. Claims 1-8 are amended. New claims 9-14 are added.

The rejections of claims 1-8 in prior Office Action dated 12/31/2007 are revised and presented together with the rejection for claims 9-14 in the following.

#### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

- (2). **Claims 1-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hart (US05921911) in view of Abe (US04042528) and Cuthbertson (US03700400).

As to a method of removing an acidic gas component from a raw gas comprising a raw gas containing an acidic gas component, comprising contacting the raw gas with an aqueous alkanolamine solution in **independent claim 1**, Hart (US05921911) discloses a method for inhibiting foam formation in alkanolamine systems (Title). The absorber is a high pressure, low temperature vessel in which the acid gas present in the hydrocarbon stream reacts with the aqueous, organic amine and is removed from the hydrocarbon stream (Col. 2, line 9-12).

As to a composition comprising an organopolysiloxane having a polyoxyalkylene group and a fine silica powder in **independent claim 1**, Hart (US05921911) discloses addition of certain non-foaming demulsifiers to the liquid to reduce the foaming and fouling in the stripper (Col. 1, line 66-67, line 61-62). The demulsifiers are selected from the group consisting of alkoxylates of the following: alkylphenols, alkylamines, alkylols and/or polyols with or without cross-linking with aldehyde, di- or multifunctional acids, epoxides and isocyanates. These are selected singly or in combinations such that the overall content of ethylene oxide (EO) is less than about 50% (Col. 2, line 57-63). Hart **does not teach** organopolysiloxane having a polyoxyalkylene group and fine silica powder as claimed.

However, Abe (US04042528) **teaches** a water-soluble defoaming agents (Title). the defoaming agents are also useful in various fields of chemical technologies. Exemplary are the process of carbon dioxide absorption by alkaline aqueous solution from cracking gases in the

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petroleum industry (Col. 5, line 18-22). Defoaming agent comprises 20 to 94% by weight of an organopolysiloxane-polyoxyalkylene copolymer 5 to 50% by weight of a polyoxyalkylene glycol derivative, and 1 to 30% by weight of a nonionic surfactant having polyoxyalkylene structure in its molecule (Abstract). The nonionic surface active agents containing oxyalkylene units in their molecule suitable for the purpose are exemplified by polyoxyethylene sorbitan fatty acid esters, polyoxyethylene-polyoxypropylene ethers with higher alcohols (Col. 4, line 34-41). Several defoaming compositions have been proposed, in which the silicones modified were admixed with finely divided inorganic fillers, such as silica (Col. 1, line 27-30). Cuthbertson (US03700400) **teaches** antifoam compositions consisting of silica-containing organopolysiloxane/oxyalkylene copolymers (Abstract, line 1-2).

The advantages of defoaming agent including organopolysiloxane-polyoxyalkylene copolymer are to have excellent properties of solubility in water, durability of anti-foaming activity and stability to alkalinity (Abstract, line 9-11). The addition of finely divided silica is to balance the tradeoff of clouding points and solubility in water and their anti-foaming activities (Abe::US04042528 - Col. 1, line 15-26) and anti-foam activity of siloxane/oxyalkylene copolymers is increased several fold by the incorporation therein of a proportion of a suitable silica (Cuthbertson:: US03700400 - Col. 1, line 46-49).

Therefore, it would have been obvious at time of the invention to add organopolysiloxane – polyoxyalkylene copolymer and fine silica disclosed by Abe, Cuthbertson in the defoaming composition of Hart in order to attain the advantages cited above.

As to the composition being added to the aqueous alkanolamine solution, based on a foaming state in a system for removing the acidic gas, from outside the system in **claim 2**, it would be obvious to one of ordinary skills in the art to add whenever it is needed – foaming state.

As to the composition being added to the aqueous alkanolamine solution before the aqueous alkanolamine solution contacts the raw gas in **claim 3**, Hart (US05921911) discloses the addition of certain non-foaming demulsifiers to the liquid, compressed hydrocarbon stream entering or **the aqueous, organic amine stream entering** or exiting an absorber of an amine unit will effectively prevent the formation of foam in the amine unit (Col. 1, line 66 – Col. 2, line 3).

As to fine silica powder having a specific surface area of 50 m<sup>2</sup>/g or more in **claim 4**, Abe does not disclose the specific surface area of finely divided silica, in the absence of showing criticality of the records, the optimized specific surface area of silica being 50 m<sup>2</sup>/g or more in known process renders obviousness to one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). Also evidenced by Cuthbertson (US03700400) that silica may be of surface area from 50 to 500 m<sup>2</sup>/g (Col. 1, line 71 – Col. 2, line 1).

As to composition being present in an amount of 0.1 to 5000 ppm based on aqueous alkanolamine solution in **claim 5**, Abe (US04042528) discloses, usually, 10 to 500 ppm of the defoaming agent (Col. 5, line 14-15). Hart (US05921911) discloses effective dosage of oil-in-water demulsifiers in alkanolamine systems ranged from about 1 ppm to 10,000 ppm (Col. 3, line 22-24).

(3). **Claims 6-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hart (US05921911) in view of Abe (US04042528) and Cuthbertson (US03700400), further in view of Rooney (WO 00/18493).

As to an additive for an aqueous amine solution for removing an acidic gas, comprising an organopolysiloxane having polyoxyalkylene group and a fine silica powder present in an amount of 0.1 to 5,000 ppm in **independent claim 6**, the disclosure of Hart, Abe, Cuthbertson is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 1 and 5 and have been discussed therein.

As to solution containing 40 by mass or more of an alkanolamine in **independent claim 6**, Hart (US05921911) **does not teach** the concentration of aqueous alkanolamine solution as claimed.

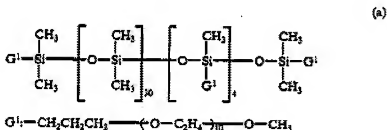
However, Rooney (WO 00/18493) **teaches** alkanolamines composition and process for removal of acid gases (Title, Abstract). The alkanolamine of formula I is present in the aqueous solution in an amount effective to remove acidic gases from a fluid stream. When the alkanolamine of formula I is used alone, it is typically present in an amount of from 7 to 50% by weight based on the total weight of the aqueous solution (page 7, line 1-5). The optimal amount of the alkanolamine of formula I will depend on the fluid stream composition, outlet fluid requirement, circulation rate, and energy available for stripping the solvent. A person of ordinary

skill in the art would readily determine the optimal amount of the alkanolamine of formula I (page 7, line 11-16).

The advantage of optimal amount of alkanolamine ranged from 7 to 50 wt% is to effectively remove the acidic gases from a fluid stream (page 7, line 1-3).

Therefore, it would have been obvious at time of the invention to use optimal amount of alkanolamine ranged from 7 to 50 wt% disclosed by Rooney for the amine solution of Hart in order to attain the advantage cited above.

As to additive being a mixture of 50 to 99% by mass of an organopolysiloxane having the polyoxyalkylene group, represented by formula (1), and 1 to 50% by mass of the fine silica powder having specific area of 50 m<sup>2</sup>/g or more in **claim 7**, Abe (US04042528) discloses the component (i) organopolysiloxane-polyoxyalkylene copolymer to be composed of from 20 to 94 wt% (Col. 4, line 43-46). As shown in the Figure below, which reads on the formula (1) of instant claim by setting X=Y; R<sup>1</sup>:CH<sub>3</sub>; R<sup>2</sup>: -(CH<sub>2</sub>)<sub>3</sub>-; R<sup>3</sup>: -CH<sub>3</sub>; m=30, n=4, p=2, q=10.



Cuthbertson (US03700400) discloses, while silica may be present in the compositions in amount up to 10 wt% of siloxane/oxyalkylene copolymer (Col. 1, line 64-66).

As to additive to be mixture of 50 to 98% by mass of an organopolysiloxane having a polyoxyalkylene group, represented by formula (1), 1 to 50% by mass of the fine silica powder having a BET specific area of 50 m<sup>2</sup>/g or more, and 1 to 40% by mass of a nonionic surfactant in **claim 8**, Abe (US04042528) discloses the component (i) organopolysiloxane-polyoxyalkylene copolymer to be composed of from 20 to 94 wt%, component (ii) of nonionic surfactant in an amount from 1 to 30 wt% (Col. 4, line 43-48). Cuthbertson (US03700400) discloses, while silica may be present in the compositions in amount up to 10 wt% of siloxane/oxyalkylene copolymer. The silica may be of surface area from 50 to 500 m<sup>2</sup>/g (Col. 1, line 64 – Col. 2, line 1).

As to method of removing an acidic gas component from a raw gas comprising contacting the raw gas with an aqueous alkanolamine solution that includes 40% by mass or more of an alkanolamine and an additive having an organopolysiloxane with a polyoxyalkylene group and a fine silica powder, the additive being present in an amount of 0.1 to 5000 ppm based on the aqueous alkanolamine solution and being a mixture of 50 to 99 % by mass of organopolysiloxane having the polyoxyalkylene group by formula (1), 1 to 50 % by mass of the fine silica powder having a specific surface area of 50 M<sup>2</sup>/g or more in **independent claim 9**, the disclosure of Hart, Abe, Cuthbertson and Rooney is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claim 6 and 7, and have been discussed therein.

As to step of providing an additional amount of additive to the aqueous alkanolamine solution based on an amount of foaming during the acid gas removal in **claim 10**, in absence of showing criticality of records, it would be obvious to provide additional amount of additive to multiple the effects to maximum such as based on an amount of foaming during the acid gas removal.

As to limitation of **claim 11**, the disclosure of Hart, Abe, Cuthbertson and Rooney is incorporated herein by reference, the most subject matters of an additive as currently claimed, have been recited in applicants' claim 9, and have been discussed therein.

As to limitation of **claim 12**, the disclosure of Hart, Abe, Cuthbertson and Rooney is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claim 8, and have been discussed therein.

As to limitations of **claims 13**, the disclosure of Hart, Abe, Cuthbertson and Rooney is incorporated herein by reference, the most subject matters of 40% by mass of alkanolamine as currently claimed, have been recited in applicants' claim 9, and have been discussed therein.

As to limitations of **claim 14**, the disclosure of Hart, Abe, Cuthbertson and Rooney is incorporated herein by reference, the most subject matters of additive as currently claimed, have been recited in applicants' claims 8 and 9, and have been discussed therein.

*Response to Arguments*

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(4). Applicant's arguments filed 03/31/2008 have been fully considered but they are not persuasive.

Applicants' arguments focus on improper combining Hart (US05921911), Abe (US04042528) because Abe and Cuthbertson are directed to a technical area (high-temperature dyeing and textile treating) that is completely different from that of Applicants' claimed invention (absorption of acid gas). Applicant further states neither Abe nor Cuthbertson addresses the issues associated with the absorption of acid gas (page 10, current Remarks). In reviewing the teaching of Abe (US04042528), it recites: The defoaming agents are also useful in various fields of chemical technologies other than in the dyeing of fabrics. Exemplary are the process of carbon dioxide absorption by alkaline aqueous solution from cracking gases in the petroleum industry (Col. 5, line 18-22). Therefore, the combining is proper in view of the teaching cited above.

#### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

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Date: June 24, 2008

/Duane S. Smith/  
Supervisory Patent Examiner, Art Unit 1797  
6-24-08

**Application Number****Application/Control No.**

10/531,719

**Examiner**

IVES WU

**Applicant(s)/Patent under  
Reexamination**

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